

2. The apparatus of claim 1 wherein said gel slab treatment cell consists of three distinct modular parts, a top plate, intermediate plates, and a bottom plate.
3. The apparatus of claim 2 wherein said top plate is equipped with a liquid level detecting sensor in a "chimney".
4. The apparatus of claim 2 wherein said top plate is equipped with a fluid inlet manifold.
5. The apparatus of claim 2 wherein said top plate is equipped with an air outlet vent.
6. The apparatus of claim 2 wherein said intermediate plate is equipped with a fluid holding reservoir.
7. The apparatus of claim 6 wherein said fluid holding reservoir is equipped with a row of partition blocks.
8. The apparatus of claim 2 wherein said intermediate plate is equipped with a shoulder on the bottom to allow it to nest into other intermediate plates or bottom plates.
9. The apparatus of claim 2 wherein said intermediate plate is equipped with an o-ring in a circumferential o-ring groove.
10. The apparatus of claim 2 wherein said intermediate plate is equipped with a row of fluid exit ports.
11. The apparatus of claim 2 wherein said intermediate plate is equipped with a drain hole located in the middle of the front and back edges of the fluid holding reservoir.
12. The apparatus of claim 2 wherein said intermediate plate may be equipped with a variety of gel slab capacity changing partitions.
13. The apparatus of claim 2 wherein said intermediate plate is equipped with a row of individual partition blocks.
14. The apparatus of claim 2 wherein said bottom plate is equipped with a fluid holding reservoir.
15. The apparatus of claim 2 wherein said bottom plate is equipped with a fluid outlet connection.
16. The apparatus of claim 2 wherein said bottom plate is equipped with a fluid holding reservoir.
17. The apparatus of claim 2 wherein said bottom plate is equipped with a liquid level sensor.
18. The apparatus of claim 17 wherein said liquid level sensor is equipped with a fluid drain sump.
19. The apparatus of claim 2 wherein said bottom plate is equipped with an o-ring in a circumferential o-ring groove.
20. The apparatus of claim 2 wherein said bottom plate may be equipped with a variety of gel slab capacity changing partitions.
21. The apparatus of claim 2 wherein said bottom plate is equipped with a row of individual partition blocks.
22. The apparatus of claim 1 wherein said valve manifold selects which reservoir the fluid handling pump will draw fluid from.
23. The apparatus of claim 1 wherein said re-circulation pump draws fluid out of the bottom, and then reintroduces said fluid to the top of, the complete treatment cell.
24. A computer assisted method for transferring a chemical or reagent to and from the treatment chamber, wherein said fluid produces a level signal indicating the presence or absence of fluid in treatment chamber and transmitting said signal to a computer.
25. The method of claim 24 further comprising the steps of: filling the chamber with a chemical reagent by means of a fluid-handling pump.

26. The method of claim 25 wherein the filling is performed until the level switch in the top plate indicates that the complete treatment cell is filled.
27. The method of claim 24 further comprising the steps of: re-circulating the fluid contained within the treatment chamber with a chemical reagent by means of a fluid-handling pump.
28. The method of claim 27 wherein the re-circulation is performed until a timer elapses in the computer.
29. The method of claim 24 further comprising the steps of draining the chamber of a chemical reagent by means of a fluid-handling pump.
30. The method of claim 24 further comprising the steps of draining the chamber of a chemical reagent by means of a fluid-handling pump.
31. The method of claim 30 wherein the draining is performed until the level switch in the bottom plate indicates that the complete treatment cell is drained.

## ABSTRACT

A system for automatically staining electrophoresis gels by utilizing an active re-circulation system and automatic level control within a modular treatment cell. The gels to be stained are placed within the treatment cell. The control console introduces specific reagents into the treatment cell. The amount of reagents introduced into the treatment cell is controlled by the level control system, which is incorporated into the treatment cell. When the level control system has determined that the cell is full, an active re-circulation is started which ensures that the entire gel surface is exposed to the reagent. On completion of the active re-circulation phase, the treatment cell is automatically drained. Verification that the treatment cell is drained is confirmed by the treatment cell level control system.